



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/717,558	11/21/2003	Shuichi Nagai	60188-715	8465

7590 01/10/2006

Jack Q. Lever, Jr.  
McDERMOTT, WILL & EMERY  
600 Thirteenth Street, N.W.  
Washington, DC 20005-3096

EXAMINER
----------

CONNELLY CUSHWA, MICHELLE R

ART UNIT	PAPER NUMBER
----------	--------------

2874

DATE MAILED: 01/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/717,558

Applicant(s)

NAGAI, SHUICHI

Examiner

Michelle R. Connelly-Cushwa

Art Unit

2874

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 01 November 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 2-6,8-14 and 16-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 14 is/are allowed.
- 6) ☒ Claim(s) 2-6,8-13 and 16-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Response to Amendment***

Applicant's Amendment filed November 1, 2005 has been fully considered and entered.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

**Claims 2-6, 8-11 and 13 are rejected under 35 U.S.C. 102(e) as being anticipated by Paiam (US 6,535,672 B1).**

Regarding claims 2-6; Paiam discloses an optical functional device in Figures 17-19, comprising:

- first and second optical waveguides having mutually different equivalent refractive indices ( $n_1$  and  $n_2$ ); and
- a connection through which the two optical waveguides are connected along an optical axis (see column 7, line 17, through column 8, line 50);

- wherein a second of the optical waveguides has an equivalent refractive index lower than that of a first of the optical waveguides;
- wherein the connection allows multimode propagation of a light passing through the second optical waveguide, and allows the light to be coupled into the first optical waveguide (see column 7, line 17, through column 8, line 50);
- wherein the first optical waveguide allows single mode propagation of a light passing therethrough (see column 3, lines 18-28);
- wherein the equivalent refractive index of the connection is changed in steps along the optical axis (the equivalent refractive index of the connection region,  $n_2$ , is changed in a step between the connection region and the output waveguides); and
- wherein the equivalent refractive index of the connection is changed in steps along a direction approximately perpendicular to the optical axis (the equivalent refractive index of the connection region,  $n_2$ , is changed in a step between the connection region and the waveguide having refractive index  $n_1$ ).

Paam discloses that the waveguide of the invention may be configured to operate as a filter/isolator (see column 5, lines 14-23).

It is noted that claims 2, 5 and 6 have been amended to incorporate that language "having at least one of functions of an optical isolator, an optical circulator and a mode converter" in the preamble of each claim. This recitation has not been given

Art Unit: 2874

patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

Regarding claim 8; Paiaam discloses an optical functional device in Figures 17-19, comprising:

- two optical waveguides having mutually different refractive indices ( $n_1$  and  $n_2$ ); and
- a connection through which the two optical waveguides are connected;
- wherein single mode propagation of a light incident on one of the optical waveguides, having a high refractive index, is allowed through the one of the optical waveguides; and
- wherein multimode propagation of a light incident on the other optical waveguides having a low refractive index is allowed through the other optical waveguide and the connection, thus realizing optical nonreciprocity.

Regarding claim 9; Paiaam discloses that the waveguide of the invention may be configured to operate as a filter/isolator (see column 5, lines 14-23).

Regarding claim 10; Applicant is claiming the product including the process of making the second optical waveguide, and therefor are of "product-by-process" nature.

Art Unit: 2874

The courts have been holding for quite some time that: the determination of the patentability of product-by-process claim is based on the product itself rather than on the process by which the product is made. *In re Thrope*, 777 F. 2d 695, 227 USPQ 964 (Fed. Cir. 1985); and patentability of claim to a product does not rest merely on a difference in the method by which that product is made. Rather, it is the product itself which must be new and unobvious. Applicant has chosen to claim the invention in the product form. Thus a prior art product which possesses the claimed product characteristics can anticipate or render obvious the claim subject matter regardless of the manner in which it is fabricated. A rejection based on 35 U.S.C. section 102 or alternatively on 35 U.S.C. section 103 of the status is eminently fair and acceptable. *In re Brown and Saffer*, 173 USPQ 685 and 688; *In re Pilkington*, 162 USPQ 147.

As such no weight is given to the process steps recited in claim 10.

Paam discloses all of the limitations of claim 10 as applied above. The second optical waveguide is wider than first optical waveguide in the connection region.

It is noted that claim 10 has been amended to incorporate that language "having at least one of functions of an optical isolator, an optical circulator and a mode converter" in the preamble of each claim. This recitation has not been given patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are

Art Unit: 2874

able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

Regarding claim 11; the first and second waveguides are provided as a planar lightwave circuit, and the first and second optical waveguides are horizontally arranged (see Figures 17 and 18).

Regarding claim 13; the first and second optical waveguide each include a core and a cladding and a difference between the equivalent refractive index of the first optical waveguide and that of the second optical waveguide is determined by the cladding.

**Claims 1 and 2 are rejected under 35 U.S.C. 102(b) as being anticipated by Leonard (US 5,854,866).**

Regarding claims 1 and 2; Leonard discloses an optical functional device in Figures 4 and 5, comprising:

- first and second optical waveguides (401 and 402 in Figure 4; 501 and 502 in Figure 5) having mutually different equivalent refractive indices; and
- a connection (406) through which the two optical waveguides are connected along an optical axis;
- wherein a second of the optical waveguides has an equivalent refractive index lower than that of a first of the optical waveguides.

It is noted that claim 2 has been amended to incorporate that language "having at least one of functions of an optical isolator, an optical circulator and a mode converter"

Art Unit: 2874

in the preamble of each claim. This recitation has not been given patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 12 and 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Paiam (US 6,535,672 B1).**

Regarding claim 12; Paiam discloses all of the limitations of claim 12 as applied above, except for specifically stating that the second optical waveguide is located over the first optical waveguide, or that the first optical waveguide is located over the second optical waveguide. The first and second optical waveguides are each provided as a planar lightwave circuit in the invention of Paiam. It is within the level of ordinary skill in the art to orient or position the device in any desired manner to ensure that the device couples with other optical elements in whatever optical network/circuit the device is employed in. Additionally, it appears that the device of Paiam would perform equally



Art Unit: 2874

well regardless of the particular orientation/position of one of the waveguides with respect to the other of the waveguides. Therefore, one of ordinary skill in the art would have found it obvious to either rotate the device disclosed by Paiam so that the first optical waveguide is located over the second optical waveguide, or the second optical waveguide is located over the first optical waveguide; or to form one optical waveguide over the other optical waveguide in order to properly align the waveguides of the device of Paiam with additional optical waveguides or optical elements that the device is employed in conjunction with.

Regarding claims 16-18; Paiam discloses all of the limitations of claims 16-18 as applied above, except for specifically stating that the optical functional device is incorporated in an optical module comprising a laser element and a light-receiving element. One of ordinary skill in the art would have found it obvious to incorporate the invention of Paiam as a filter in any optical system/module, which includes both a laser element and a light-receiving element, since the optical functional device of Paiam is an optical coupler, and optical couplers are commonly used to couple light that originates at a laser source and is received at a light-receiving element in an optical system/module.

#### ***Allowable Subject Matter***

Claim 14 is allowed.

#### ***Response to Arguments***

Applicant's arguments filed November 1, 2005 have been fully considered but they are not persuasive.

*Regarding the rejection of claims 1-11, 13 and 15 under 35 U.S.C. 102(e) as being anticipated by Paiam (US 6,535,672 B1):*

Applicant states that Paiam does not disclose, among other things, two optical waveguides respectively having mutually different equivalent refractive indices, which realizes optical non-reciprocity, as recited in independent claims 2, 5, 6, 8 and 10; that Paiam's two waveguides have the same refractive index at room temperature, and in order to switch the optical paths, the temperature of the connection is varied; that the present invention does not require the temperature of the connection to be varied in order to switch an optical path; and that the waveguides of the present invention have mutually different equivalent refractive indices and optical non-reciprocity can be obtained at room temperature.

The Examiner disagrees. Paiam discloses a device that meets the claimed structural limitations and is capable of performing the claimed function, as discussed above.

The translation term "comprising", which is synonymous with "including", "containing", or "characterized by," is inclusive or open-ended and does not exclude additional, unrecited elements or method steps. *Moleculon Research Corp. v. CBS, Inc.*, 793 F.2d 1261, 229 USPQ 805 (Fed. Cir. 1986) *In re Baxter*, 656 F.2d 679, 210 USPQ 795, 803 (CCPA 1981); *Ex parte Davis*, 80 USPQ 448, 450 (Bd. App. 1948) ("comprising" leaves "the claim open for the inclusion of unspecified ingredients even in major amounts"). Since the claims of the present application use the translation term "comprising", the claims are open-ended.

The language of the claims does not require the equivalent refractive index of the second optical waveguide to always be lower than that of the first optical waveguide at every temperature. Rather, the claims, as written, encompass any situation in which the effective refractive index of the second optical waveguide is lower than that of the first optical waveguide, including the situation where the temperature has been varied or changed to accomplish this. The language of the claims, therefore, does not prohibit the presence of an element to vary the temperature, and, furthermore, does not require that the claimed features be present at room temperature or that the claimed functions occur at room temperature. Therefore, the prior art meets the claimed limitations as set forth above.

An apparatus claim must be structurally distinguishable from the prior art. While features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function (*In re Schreiber*, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997); See MPEP 2114 [R-1]). A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus if the prior art apparatus teaches all of the structural limitations of the claim (*Ex parte Masham*, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987); See MPEP 2114 [R-1]).

The Examiner notes the limitation "thus realizing optical nonreciprocity", which is recited in the last two lines of claims 8 and 17, does not define any structure. The prior art meets the structural limitations of the claim and, therefore, is capable of performing

Art Unit: 2874

this function. Thus, the prior art anticipates the claimed invention. It is also noted that claims 2, 5, 6 and 10 do not recite optical non-reciprocity, and that Applicant has indicated that this function is achieved by the claimed structure of those claims (see lines 12-14 on page 10 of the response filed November 1, 2005 by Applicant).

*Regarding the rejection of claims 1 and 2 under 35 U.S.C. 102(b) as being anticipated by Leonard (US 5,854,866):*

Applicant states that Leonard does not disclose among other things, two optical waveguides respectively having mutually different equivalent refractive indices, which allow for realization of optical nonreciprocity, as recited in claim 2; and that Leonard does not disclose that a refractive index difference is generated between the two waveguides. Refractive index is the ratio of the velocity of light in a vacuum to the velocity of light in a refractive material for a given wavelength. Therefore, refractive index of a material depends on the material itself. Different materials have different refractive indices. Since, Leonard discloses that the two waveguides (401 and 402) are made of different core materials (PSG and polymer, respectively), it follows that the two waveguides have different equivalent refractive indices. Therefore, Leonard does disclose two optical waveguides having mutually different equivalent refractive indices. And, as indicated by Applicant, optical nonreciprocity is provided by the two optical waveguides having mutually different equivalent refractive indices (see page 12, lines 1-3 and lines 12-15, filed November 1, 2005 by Applicant).

*Regarding the rejection of claims 12 and 16-18 under 35 U.S.C. 103(a) as being unpatentable over Paiam (US 6,535,672 B1):*

Art Unit: 2874

Applicant states that these claims are allowable for the same reasons as independent claims 2, 5, 6, 8 and 10. The Examiner disagrees for the same reasons set forth above.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning the merits of this communication should be directed to Examiner Michelle R. Connelly-Cushwa at telephone number (571) 272-2345. The examiner can normally be reached 9:00 AM to 7:00 PM, Monday-**Thursday**.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney B. Bovernick can be reached on (571) 272-2344. The fax phone

Art Unit: 2874

number for the organization where this application or proceeding is assigned is 571-273-8300.

Any inquiry of a general or clerical nature should be directed to the Technology Center 2800 receptionist at telephone number (571) 272-1562.

*Michelle R. Connelly-Cushwa*  
Michelle R. Connelly-Cushwa  
Patent Examiner  
January 4, 2006